

REMARKS

Claims 25-48 are all the claims pending in the application. Claim 25 has been amended based on, for example, page 7, lines 27-28 and page 11, lines 10-16 of the specification. In addition, claim 27 was amended to correct the spelling of "aluminum".

Entry of the above amendment is respectfully requested.

I. Response to Rejection of Claims 25-48 Under 35 U.S.C. § 103(a)

Claims 25-38 and 40-48 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Spears et al. (US 6,455,148) in view of Botros (US 2004/0116602).

In addition, claim 39 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Spears in view of Botros, and further in view of JP 56-132709.

Applicants respectfully traverse the rejections for the reasons of record and for the following reasons.

Claim 25 is directed to a metal laminate comprising between two outer metal sheets an adhesive polymer layer, characterised in that the adhesive polymer layer comprises cross-linked polyethylene or a copolymer thereof, simultaneously grafted with 0.1 to 2% by weight of the polymer composition of a silane compound and with 0.5 to 1.5% by weight of the polymer composition of an unsaturated carboxylic acid and/or a derivative thereof.

It is respectfully submitted that none of the cited documents teach or suggest a cross-linked polyethylene or a copolymer thereof, simultaneously grafted, as recited in claim 1, nor the weight concentrations ranges recited in claim 1.

a) Simultaneously grafted polyethylene or copolymer thereof

As discussed on page 3, lines 2-4 of the specification, the present invention aims to provide metal laminates which may be used at temperatures of up to 220°C. Said temperature resistance of the metal laminate is obtained when the polyethylene is simultaneously grafted

with a silane compound and with an unsaturated carboxylic acid and/or a derivative thereof, as discussed on page 12, lines 18-22 of the specification. Simultaneous grafting leads to a denser crosslinking (assessed by the temperature resistance and the tensile modulus) without compromising the adhesion resistance, as the carboxylic acid grafts remain available. A simultaneous grafting is only possible if the two different compounds (*i.e.*, the silane and the unsaturated carboxylic acid and/or a derivative thereof) are added simultaneously into the polymer blend.

This is not the case in Botros. In Botros, the grafting is done before adding the grafted polymer into the blend. As the polymers of Botros are not simultaneously grafted, only the silane-grafted polymers take part in the cross-linking, while the MAH-grafted polymers only take part in the metal-polymer adhesion. The temperature resistance and adhesion properties thus obtained are insufficient. In Botros, it is only possible to reach 120°C, as can be seen from [0009] and tables I to IV, which clearly demonstrate a strong decrease of the adhesion between 23°C and 120°C. Adhesion is already so low at 120°C that a sufficient adhesion at 200°C cannot be expected in Botros. In this regard, it is well known that values above 1 daN/cm are necessary at 200°C to expect a good behavior of the laminate, for example, in automotive applications.

Therefore, it is submitted that one of ordinary skill in the art would not look to Botros, which would not be considered as disclosing metal laminates usable at temperatures of up to 220°C. In addition, even if Botros were considered, it fails to teach or suggest simultaneous cross-linking and the advantages therefrom as evidenced in the present invention.

Furthermore, contrary to the Examiner's assertion, silanes and carboxylic acids do not react together to form chemical links, and the Examiner's reference to US 2006/0222869 is misplaced. If silanes and carboxylic acids do react together to form chemical links, it would not

be possible for Applicants to mix silanes and carboxylic acids to achieve simultaneous grafting in the present invention.

Moreover, there is nothing in Botros that teaches or suggests that a link exists between the MAH-grafted polymer and the silane-grafted polymer.

For at least the foregoing reasons, it is submitted that the claimed polymer layer is not taught or suggested by Spears and Botros.

b) weight concentration ranges

Compared to Botros, the claimed polymer layer exhibits superior temperature resistance/adhesion ratio as a result of the cross-linking/simultaneous grafting ratio. There is a close connection between cross-linking and simultaneous grafting as, for example, an excess presence of grafted moieties might interfere with subsequent cross-linking. *See* page 8, lines 1-2 of the specification. The cross-linking/ grafting ratio results in the use of 0.5 to 1.5% of carboxylic acid and/or derivative thereof in weight of the polymer composition and 0.1 to 2% of organosilane in weight of the polymer composition, allows for:

- 1) a high cross-linking degree, leading to an appropriate temperature resistance, and
- 2) combined with a specific grafting, leading to an appropriate adhesion.

The cross-linking in the present invention is especially controlled/measured through the tensile modulus measurement at 200°C. It is indeed well known that the stronger the cross-linking, the higher the tensile modulus. In this regard, a non-null value indicates that the product is crosslinked enough to resist to the considered temperature. The results presented in Table 4 of the present specification clearly shows that the claimed polymer composition is cross-linked enough to resist at 200°C, contrary to Comparative Example 4.

Botros neither teaches nor suggests a polymer composition having said weight concentrations ranges. Indeed, none of the examples disclosed by Botros show a formulation containing 0.5 to 1.5% of carboxylic acid with respect to the total weight of the polymer composition, as illustrated in the table below. The values are in fact rather far away from the claimed concentration range. Further, Botros does not contain any teaching or suggestion that would lead one of skill in the art to select or arrive at the claimed weight range.

Blend	% carboxylic acid/.total weight of polymer composition
A	0.24
B	0.14
C	0.24
D	0.14
E	0.25
F	0.14
G	0.25
H	0.14

For at least the foregoing reasons, it is submitted that the claimed weight concentration ranges are not taught or suggested by Spears and Botros.

In view of the above, it is respectfully submitted that claim 25 is patentable over the cited art.

Moreover, claims 26-48 depend from claim 25, and thus is it respectfully submitted that these claims are patentable over the cited art for at least the same reasons as claim 25.

Accordingly, withdrawal of the rejections is respectfully requested.

II. Conclusion

For the foregoing reasons, reconsideration and allowance of claims 25-48 is respectfully requested.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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